



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
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MEMORANDUM

SUBJECT: Summary of Regional Remedy Review Team (RRRT) Process for Sherwin-Williams/Hilliards Creek Superfund Site Operable Unit 2 Proposed Remedy

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Introduction and Purpose

This memorandum is to summarize Region 2's RRRT process for the preferred response action at Operable Unit 2 (OU2) of the Sherwin-Williams/Hilliards Creek Superfund (SW/HC) Site in Gibbsboro, New Jersey. The office of Solid Waste and Emergency Response Directive 9285.6-21 (*National Remedy Review Board Criteria Revision and Operational Changes*, September 4, 2014) calls for regions to implement a regional remedy review team (RRRT) to evaluate Superfund Site response actions costing between \$25 million and \$50 million. The preferred response action at OU2 of the SW/HC Site is estimated at \$39 million.

Regional Remedy Review Team Process

Region 2 established an RRRT independent of Site project teams to conduct objective reviews of Superfund response actions. The core group of the RRRT is comprised of remedial branch chiefs in the Superfund division and the Regional representatives to the NRRB. For each review, additional RRRT members are invited to participate based upon the needs of the project, and generally include non-site team subject-matter experts, the site attorney, and one additional non-site team senior Remedial Project (RPM) or supervisor. For the SW/HC OU2 project, the RRRT members included the Site ecological and human health risk assessors, hydrogeologist, attorney, section and branch chief, two section chiefs from independent branches, as well as Region 2's two members of the NRRB. In addition, from the Office of Superfund Remediation and Technology Innovation (OSRTI), our regional reviewer, the NRRB chair and the lead expert participated.

On February 20, 2019, the RPM for the SW/HC Site presented the following information to the RRRT:

- SW/HC OU2 Site setting and history;
- Results of the Remedial Investigation (RI), including human health and risk assessment findings;
- Detailed descriptions and discussion of the Remedial Action Objectives (RAOs) and remedial alternatives;
- Conceptual Site model;
- Detailed description of the preferred alternative, including cost; and
- Community and State perspectives.

The presentation concluded with a question and discussion session among the RRRT, OSRTI, and the SW/HC OU2 team. This included a review of the decision criteria from Directive 9285.6-21, and examination of the Site and the preferred response action with regard to innovative remedial technologies, principal threat wastes, risk assessment, community interests and state involvement. Various aspects of the information presented were discussed, but the relationship between the risk assessment results and the remedial action objectives was the primary focus. As a result of this discussion, this information was clarified in the memo and proposed plan.

Site Information and Setting, Historic Actions, and Present Site Use

The SW/HC Superfund Site, located in Gibbsboro and Voorhees, New Jersey. The Site includes the former manufacturing plant (FMP) area, portions of Silver Lake, Hilliards Creek, and Kirkwood Lake. The OU1 Record of Decision (ROD) for the Site was finalized in 2015, and addresses shallow contaminated soils on residential properties in Gibbsboro and Voorhees, New Jersey. The soil remediation at 10 residential properties has been completed, while Remedial Design/Remedial Action activities at an additional 40 residential properties is on-going. The preferred alternatives for OU2 will address contaminated soils at the FMP area, light non-aqueous phase liquid (LNAPL) at the FMP area and properties east of the FMP area, and will also address the contaminated soils and sediment of the upper portion of Hilliards Creek. A future operable unit (OU3) will address groundwater contamination present at the FMP area. In addition, a future operable unit (OU4) will address soil and sediment contamination present at portions of Silver Lake, the remaining contaminated sediment and floodplain soils of Hilliards Creek (not addressed under OU2), and Kirkwood Lake.

The FMP area is approximately 25 acres in size. For roughly 130 years the FMP area was the location of large-scale paint, lacquer and varnish manufacturing activities. Significant features of the FMP consisted of manufacturing buildings, tank farms, and waste disposal lagoons. Several tank farms throughout the FMP area contained above-ground and underground tanks of raw materials (i.e., mineral spirits, benzene, toluene, etc.) (see Figure 1). Spills from the tank farms impacted Hilliards Creek and groundwater. A series of unlined lagoons were located south of the manufacturing plant and tank farms. These unlined lagoons collected wastewater from the paint manufacturing process. During operations, concentrated sludge material from the lagoons was disposed at the United States Avenue Burn Superfund Site, Gibbsboro, New Jersey.

Early Site enforcement activities were performed by the New Jersey Department of Environmental Protection (NJDEP). When the plant closed in 1978, NJDEP ordered Sherwin-Williams to remove over

8,100 cubic yards of sludges from the former lagoons. Sherwin-Williams sold the FMP area to a developer (Scarborough) who renovated many of the existing large buildings converting them into office/storage buildings. In the early 1980's, NJDEP discovered a petroleum seep on the bank of Upper Hilliards Creek. NJDEP issued additional orders to Sherwin-Williams to contain the seep and begin RI activities that continued through the 1990s. In 2001, NJDEP terminated their order with Sherwin-Williams and the Site lead was transferred to EPA. A number of removal actions and investigations were performed by Sherwin-Williams under EPA's removal authority. The Site was placed on the National Priorities List (NPL) in 2008.

The FMP area is zoned commercial/light industrial and has been owned and operated by Brandywine Realty (Brandywine) since 1997. In 2014, Brandywine demolished the 6 East Clementon building and left the concrete slab. Existing buildings include 1, 2, 4, 5, 7, and 10 Foster Avenue (see Figure 2). Buildings 5, 7 and 10 Foster Avenue are occupied and used as office space. Brandywine has informed EPA that they intend to maintain the current zoning (commercial/light industrial) and that they are receptive to deed notices on areas of the FMP. The mayor of Gibbsboro has expressed the Borough's interest for future residential use of the FMP.

RI Findings

A summary of the RI findings is presented below. The contamination at the FMP area may be grouped into three general categories: a) *contaminated shallow soils found in several separate broad areas*, b) *LNAPL/residual product*; and c) *contaminated floodplain soils and sediments within Hilliards Creek*. LNAPL is generally not present where shallow soil contamination is found (i.e., metals, PAHs, etc). This becomes integral to the remedial alternatives discussion later.

Contaminated Shallow Soils

Contaminated shallow soils consisting of lead, arsenic, PAHs, and in very isolated areas, PCBs, extends to a depth of six to eight feet throughout portions of the FMP. Lead and arsenic are the most widely spread contaminants and are found most frequently above the NJDEP Residential Direct Contact Soil Remediation Standard (RDCSRS), 400 ppm and 19 respectively. Lead and arsenic are found beneath the paved surfaces that surround the 10 Foster Avenue and 7 Foster Avenue buildings and the 6 East Clementon Slab. Monitoring well and soil data collected below the water table, in the footprint of the 6 East Clementon Slab, indicate arsenic is a source of shallow groundwater contamination. The source of PCB contamination matches the location of a historic electrical transformer substation.

Contaminated Shallow Soils are also found in the former lagoon area which is located south of the 1 Foster Avenue building. Shallow soils in the lagoon area primarily contain pentachlorophenol contamination above RDCSRS and Impact to Groundwater Soil Screening Levels (IGWSSLs). Several shallow monitoring wells within this area have high concentrations of pentachlorophenol in groundwater. The source of this contamination is residual lagoon wastes that were not excavated by Sherwin-Williams under the NJDEP order.

LNAPL/Residual Product

LNAPL at the Site consists primarily of degraded mineral spirits and is a source of downgradient groundwater contamination, as well as vapors beneath on-Site buildings. The LNAPL contamination is first encountered at the water table. The depth to the water table varies in different locations of the FMP ranging from immediately below ground surface to 14 feet below ground surface.

The source of the LNAPL is located at the former Tank Farm A, now a parking lot immediately north of the 2 Foster Avenue building and immediately east of the 4 Foster Avenue building. The LNAPL is located beneath the parking lot and beneath these buildings. LNAPL at this location is first encountered approximately eight to ten feet below ground surface, and extends to 33 feet (nearly 25 feet in thickness). LNAPL has migrated from this area to the south and east beneath portions of Foster Avenue and U.S. Avenue.

South of Foster Avenue, the land surface slopes down toward a parking lot at 1 and 5 Foster Avenue. Due to the lower elevation of the parking lot, the NAPL in this area is found immediately below the ground surface and extends approximately five to seven feet deep. This shallow LNAPL has migrated from the parking lot beneath the 5 Foster Avenue building and into Hilliards Creek. This shallow area of LNAPL is known as the Seep Area because LNAPL intermittently seeps through the parking lot surface.

From its source at 2 and 4 Foster Avenue, the LNAPL has also migrated to the east under U.S. Avenue, and beneath residential properties and a vacant commercial lot. The LNAPL in this area is first encountered approximately 14 feet below ground surface, and is one to four feet thick.

In general, NAPL is the only contaminant present throughout all of the areas impacted with LNAPL contamination. The LNAPL is considered principal threat waste because it is mobile and is a source to other media, including vapors, groundwater and soil.

Contaminated Floodplain soils and sediments

Hilliards Creek extends one mile from Silver Lake to Kirkwood Lake. The reach of Hilliards Creek between Foster Avenue to West Clementon Road is referred to as Upper Hilliards Creek and is being addressed as part of this Operable Unit. The Middle and Lower reaches of Hilliards Creek will be addressed as part of OU4. Upper Hilliards Creek soil and sediment contain metals, PAHs and low levels of PCBs above RDCSRS and Site-specific ecological preliminary remediation goals (PRGs). Metals found most frequently above the RDCSRS and the PRGs are lead, arsenic and cyanide. The concentrations of the metals in sediment and soil are found at higher concentrations than those present throughout the upstream paved areas of the FMP and are present at relatively consistent concentrations throughout Upper Hilliards Creek. PAHs in soil and sediment are present at highest concentrations near Foster Avenue and decrease downstream toward West Clementon Road. Low levels of PCBs in sediment also decrease in concentration further downstream.

Human Health and Ecological Risk Findings

As part of the RI/FS, a baseline risk human health risk assessment (HHRA) and a baseline ecological risk assessment (BERA) were conducted to estimate current and future effects of contaminants on human health and the environment.

HHRA Discussion and Findings

The northern FMP area is currently utilized as an office and light industrial park and contains a number of paved parking lots and buildings, surrounded by a residential community. The southern portion of the FMP, location of the former lagoons, is now a woodland. Upper Hilliards Creek was assessed as part of the former lagoon area in the HHRA.

Based on current zoning and future land use assumptions, the following current and future receptor populations and routes of exposure were considered in all exposure areas:

- Construction/Utility Worker (adult): incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface (0-2 feet) and subsurface soils (2-10 feet).
- Outdoor Worker (adult): incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface soils.
- Resident (child [0-6 years] and adult): incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface soils.

Exposure pathways specific to Upper Hilliards Creek and the former lagoon area included the following:

- Recreator (adult, adolescent [6-16 years], and child): incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface soils; incidental ingestion and dermal contact of sediments along with dermal contact with surface water while wading in Upper Hilliards Creek. Upper Hilliards Creek is not capable of supporting fish for recreational consumption and therefore, fish ingestion was not included in the recreator pathway. Fish ingestion for the lower portions of Hilliards Creek and lakes is included in the waterbodies Operable Unit 4.

Buildings within the FMP area were also evaluated for potential vapor intrusion. The HHRA evaluated the potential risks associated with this pathway to the current and future commercial worker resulting from the inhalation of contaminants in indoor air.

Outside the LNAPL areas, the HHRA found that exposure to contaminants in surface soils, subsurface soils, and sediments exceeds EPA's threshold criteria. Based on these results, arsenic and lead were identified as the primary contaminants of concern (COCs); however, exposure to other metals (antimony, chromium and cyanide), PCBs (Aroclor 1260), and SVOCs (benzo(a)pyrene and 1,1-biphenyl, 2,3,4,4,5,5-hexachloro [TIC]) were also identified in soils and/or sediment exceeding cancer risk and noncancer hazard thresholds at some of the exposure areas evaluated.

The exceedances of sub-slab and indoor air vapor intrusion screening levels (VISLs) from compounds volatilizing off of the LNAPL indicate a potential risk to commercial workers at 2 Foster Avenue and 4 Foster Avenue. The HHRA determined the following compounds as being sub-slab COCs: 1,2,3-

trimethylbenzene, 1,2,4-trimethylbenzene, benzene, cyclohexane, ethylbenzene, m,p-xylenes, n-hexane, n-nonane, o-xylene, tetrachloroethene, trichloroethene, and vinyl chloride. The following COCs were identified for indoor air: acrolein, benzene, benzyl chloride, bromodichloromethane, chloroform, 1,2-dichloroethane, ethylbenzene, naphthalene, 1,1,2,2-tetrachloroethane, and trichloroethene. Since these buildings are currently unoccupied, the vapor intrusion pathway remains incomplete, however, the exceedances of both sub-slab and indoor air VISLs indicate potential risks if these buildings were to be used in the future.

Based on the results of the human health risk assessment, a remedial action is necessary to protect public health, welfare and the environment from actual or threatened releases of hazardous substances.

BERA Discussion and Findings

A baseline ecological risk assessment was conducted to evaluate the potential for ecological risks from the presence of contaminants in sediment, surface water, pore water and soil. The aquatic habitat is the stream, while the terrestrial habitat includes the Upper Hilliards Creek floodplain and adjacent forested areas, and the former lagoon area. Media concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors by habitat type.

Ecological risks identified in the BERA for key inorganic COCs are primarily associated with localized elevated concentrations in soil and sediment within and near Upper Hilliards Creek, whereas much lower soil contaminant levels are in upland areas away from Upper Hilliards Creek and are expected to pose minimal risks to wildlife.

The BERA provided evidence that COCs, primarily arsenic, lead and cyanide are present in both aquatic and terrestrial environments and pose unacceptable risk to wildlife receptors. The greatest potential for exposure and unacceptable risk in Upper Hilliard's Creek is to aquatic invertivorous receptors (spotted sandpiper) from the ingestion of contaminated sediments and food items. There is low potential for toxicity to benthic organisms. Inorganic contaminants (arsenic, lead and manganese) may pose unacceptable risk to the aquatic community (fish) based upon the exceedance of risk-based benchmarks in pore water, surface water and fish tissue. Overall, terrestrial wildlife risks are driven primarily by arsenic and lead. Insectivorous wildlife (the American Robin and Short-Tailed Shrew) were identified as the wildlife receptors with the highest predicted exposures and hazard quotients in the terrestrial area (Hilliards Creek and the former lagoon area) of the Site. Similarly, the Spotted Sandpiper was identified as the receptor with the highest exposure and hazard quotient associated with the aquatic community in Upper Hilliards Creek.

Based on the results of the ecological risk assessment a remedial action for soil and sediment is necessary to protect the environment from actual or threatened releases of hazardous substances.

Proposed Response Actions

The following Remedial Action Objectives (RAOs) were developed for OU2:

Soil

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure to soil.

- Minimize migration of Site-related contaminants in the soil to sediment, surface water and groundwater.

Sediment

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure to sediment.
- Minimize migration of Site-related contaminants in the sediment to surface water.

LNAPL

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from direct contact with LNAPL.
- Minimize migration of LNAPL-related compounds in groundwater.

Vapor Intrusion

- Prevent potential current and future unacceptable risks to human receptors resulting from inhalation of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) originating in LNAPL.
- Prevent potential current and future risks to human health resulting from the presence of methane in soil gas.

Based on these RAOs, five remedial response actions for OU2 of the SW/HC Site were developed for contaminated soils, including the FMP area impacted with LNAPL contamination. In addition, three remedial alternatives were developed for Upper Hilliards Creek contaminated sediments.

Soil cleanup goals for contaminated soils at the FMP area are based on the: RDCSRS, ecological cleanup goals, IGWSSL, and the determination that LNAPL is a principal threat waste. The FMP area is currently zoned commercial/light industrial, however, the RDCSRS are applicable as the Borough has indicated an anticipated residential future use. The adjoining property to the north is being redeveloped for residential use. Ecological cleanup goals will be applied for the top one foot of soils immediately adjoining Hilliards Creek. Ecological cleanup goals are protective of human health.

IGWSSL are applicable at all portions of the FMP area where soil contamination exists above the water table. The default IGWSSL will apply unless Site-specific impact to groundwater soil remediation goals are developed. Site-specific soil remediation goals have been developed for other areas where soil contamination exists beneath the water table and the contamination serves as a source to shallow groundwater contamination. Further evaluation of contamination below the water table will be considered as part of OU3.

The latest screening criteria for vapor intrusions, the Vapor Intrusion Screening Levels (VISLs) will be used to evaluate subslab and indoor air quality over time.

Finally, the LNAPL contamination is considered to be principal threat waste, due to its chemical and physical characteristics and mobility. Attached Tables 1 and 2 contain the cleanup goals for this operable unit.

Remedial Response Actions for Contaminated Soils and LNAPL

There are multiple areas of the site that are components of each Alternative. Each area is defined below and their locations are indicated on Figure 3.

Area 1: North of Foster Avenue, in the vicinity of the 10 Foster Avenue Building and 6 E. Clementon Slab and south of Foster Avenue in the vicinity of 7 Foster Avenue building.

Area 2: 2 and 4 Foster Avenue buildings and parking lot east of the buildings where LNAPL is present.

Area 3: Properties Impacted with LNAPL/Residual Product (east of the FMP area).

Area 4: Parking/Paved Area in vicinity of 1 and 5 Foster (also known as the Seep Area).

Area 5: Former Lagoon Area.

Area 6: Upper Hilliards Creek Floodplain Soils.

Alternative 1: No Action

Soil Alternative 2 - Targeted Surface Soil Removal, Capping and Institutional Controls

Capital Cost	\$4,953,000
O&M Cost	\$136,499
Present Worth Cost	\$5,777,000
Time to Complete	9 months

This alternative would use engineering controls consisting of impermeable caps and soil covers as the primary method to prevent exposure to the contaminants in Site soils in Areas 1, 2, 4, 5 and 6. Existing impermeable caps, consisting of existing buildings, concrete building slabs, asphalted parking areas and roadways in Areas 1, 2, and 4 would serve as the engineering control under this alternative. Institutional controls in the form of a Deed Notice would be required to ensure that future use of the Site recognizes and maintains these controls.

Up to two feet of soil would be removed from Areas 5, the Former Lagoon Area, and Area 6, the Upper Hilliards Creek Floodplain. Following the shallow soil removal, if the RDCSRS are achieved, the area would be backfilled and revegetated. Subsurface locations, where constituents remain at concentrations greater than the RDCSRS, would receive a cap. The cap would consist of a demarcation layer, one and a half feet of common fill and six inches of topsoil. The area would be revegetated according to regulatory requirements. No capping would be required for Area 3.

A Deed Notice would be established for those areas where constituents remain at concentrations greater than the RDCSRS.

Soil Alternative 3 – Soil Removal, LNAPL Removal/Bioremediation and Soil Gas Removal, with Capping and Institutional Controls

Capital Cost	\$24,118,000
O&M Cost	\$1,362,000
Present Worth Cost	\$30,333,000
Time to Complete	7 years

This alternative, similar to Soil Alternative 2, would rely on engineering and institutional controls, to control exposure to much of the contamination at the FMP. Soil Alternative 3 would consist of the following actions:

Area 1: North of Foster Avenue, in the vicinity of the 10 Foster Avenue building and 6 E. Clementon Slab and south of Foster Avenue in the vicinity of 7 Foster Avenue building

- Remove the soil that is the source of arsenic found in groundwater north of Foster Avenue to a depth of 15 feet.
- Remove soil, to a depth of approximately six feet, containing PCBs concentrations greater than 50 mg/kg (the concentration at which the PCBs become defined as a PCB remediation waste under TSCA) at locations adjacent to the Silver Lake conveyance north of Foster Avenue.
- Install an impermeable cap in those areas where soil removal was conducted.
- Maintain the existing impermeable caps consisting of asphalted parking lots, roadways, concrete building slabs, and buildings. Locations not covered by the impermeable caps would be evaluated to determine if unsaturated soil containing contaminants at concentrations greater than the IGWSSL would be removed or if impermeable capping would be expanded onto those areas.
- Address any underground structures that may be a source of contamination.

Area 2: 2 and 4 Foster Avenue buildings and parking lot east of the buildings

- Maintain the existing impermeable asphalt cap and soil cover.
- Cap or remove contaminants exceeding IGWSSL not currently paved.
- Install a LNAPL recovery system at the 2 and 4 Foster Avenue buildings.
- Install a system to deliver nutrients to the LNAPL across the Former Resin Plant/Tank Farm A area to stimulate existing LNAPL biodegradation.
- Install a system to remove methane and other soil gas from the subsurface.
- Address any underground structures that may be a potential source of contamination.

Area 3: Properties Impacted with LNAPL/Residual Product east of the FMP property

- Install injection wells and soil gas extraction wells on the former tavern/service station property and on the west side of U.S. Avenue.
- Install pressurized nutrient injection wells along the U.S. Avenue right of way east of U.S. Avenue and south of the former tavern/service station.
- Install soil gas extraction and treatment, and nutrient mixing and injection systems in the eastern parking area of the 2 and 4 Foster Avenue buildings.
- Install piping beneath U.S. Avenue from the former tavern/service station to the 2 and 4 Foster Avenue parking area.
- Conduct direct push nutrient injections in those areas beneath impacted properties along U.S. Avenue where LNAPL is present.

- Operate the nutrient injection and soil gas recovery systems.

Area 4: Parking/Paved Area in vicinity of 1 and 5 Foster (also known as the Seep Area)

- Remove soil containing LNAPL from the Seep Area to an approximate depth of five to seven feet.
- Restore the excavation area and reinstall the parking area.
- Install a collection trench south of Foster Avenue to prevent LNAPL transport under Foster Avenue from the parking area east of 2 and 4 Foster Avenue (source of LNAPL) to the Seep Area and Upper Hilliards Creek.

Area 5: Former Lagoon Area

- Remove soil from the western portion of the Former Lagoon Area to a depth of approximately eight feet below ground surface to address the source of pentachlorophenol in groundwater.
- Remove any additional unsaturated soil where pentachlorophenol is present at concentrations greater than the default IGWSSL. A Site-specific remediation goal that is protective of groundwater would be developed in the Pre-Design Investigation.
- Restore the excavation areas and maintain the existing soil cap that is present across the remainder of the former Lagoon Area.

Area 6: Upper Hilliards Creek Floodplain Soils

- Remove all soil containing constituents greater than the ecological PRGs in the top one foot of the Upper Hilliards Creek flood plain.
- Remove all soil at depths greater than one foot where constituents are present at concentrations greater than the RDCSRS throughout the Upper Hilliards Creek floodplain.

Soil Alternative 4 – Deep and Intermediate Soil Removal, LNAPL Removal/Bioremediation, Soil Gas Removal with Capping and Institutional Controls

Capital Cost	\$30,757,000
O&M Cost	\$1,362,000
Present Worth Cost	\$36,972,000
Time to Complete	7 years

Under Alternative 4, the scope of the remediation in following area (Area 1) differs from Alternative 3. All of the other elements remain the same as Alternative 3.

Area 1: North of Foster Avenue, in the vicinity of the 10 Foster Avenue building and 6 E. Clementon Slab and south of Foster Avenue in the vicinity of 7 Foster Avenue building

- Excavate all soil contamination exceeding the RDCSRS and/or IGWSSL at the FMP north of Foster Avenue to a depth of four feet below the soil surface. The excavation to remove exceedances of RDCSRS and IGWSSL to 4 feet would apply to all areas except existing building footprints. Areas within the four-foot excavation footprint that exceed RDCSRS and/or IGWSSL would receive either a soil or impermeable cap. An impermeable cap would be required for areas where contaminant levels exceeding the IGWSSL remain between the water table and the excavation bottom. A soil cap may be used for soil remaining below the excavated

areas that do not exceed IGWSSL values or IGWSSL do not apply (below the water table) but RDCSRS exceedances remain.

- Excavate soil contamination exceeding the RDCSRS and/or IGWSSL on the 7 Foster Avenue commercial lot to a depth of four feet below the soil surface in all areas except for the 7 Foster Avenue building footprint. Areas within the excavated footprint that exceed RDCSRS and/or IGWSSL would receive either a soil or impermeable cap. An impermeable cap would be required for areas where contaminant levels exceeding the IGWSSL remain between the water table and the excavation bottom. A soil cap may be used for soil remaining below the excavated areas that do not exceed IGWSSL values or IGWSSL do not apply (below the water table) but RDCSRS exceedances remain.

Soil Alternative 5 – Extensive Excavation to Depth and Institutional Controls

Capital Cost	\$104,922,000
O&M Cost	\$13,650
Present Worth Cost	\$107,332,000
Time to Complete	8 years

This alternative would remove all soil exceeding PRGs and RDCSRS and all soil containing LNAPL regardless of depth. The scope of Alternative 5 would be:

Area 1: Area north and south of Foster Avenue, including the 6 E. Clementon Slab, and all paved surfaces that surround 10 and 7 Foster Avenue buildings

- Removal of the parking areas on the property adjacent to the 7 Foster Avenue building, and the parking areas and the majority of the 6 East Clementon Road building slab on the property adjacent to the 10 Foster Avenue building.
- Removal of soil to a depth of one to ten feet on the property adjacent to the 7 Foster Avenue building.
- Removal of soil to depths of five to fifteen feet on the property currently occupied by the 6 East Clementon Road building slab and adjacent to the 10 Foster Avenue building.
- Removal of any underground structures that may represent a source of contamination.
- Backfilling all areas to existing grade.

Area 2: 2 and 4 Foster Avenue buildings and parking lot east of the buildings

- Removal of the 2 and 4 Foster Avenue buildings and building slabs.
- Removal of the parking area and former red barn building slab.
- Removal of soil containing LNAPL to a depth of 25 feet bgs.
- Removal of any below ground structures that may represent potential sources of contamination.
- Removal of soil to seven to ten feet on the slopes towards Foster Avenue and U.S. Avenue and backfilling all areas to existing grade.

Area 3: Properties Impacted with LNAPL/Residual Product (east of the FMP property)

- Demolition and replacement of several smaller buildings such as garages and

- storage sheds;
- Temporary relocation of residents from five residential properties and workers from one commercial property for as long as one year each;
- Management of several million gallons of groundwater that is potentially contaminated with LNAPL constituents;
- Installation of approximately 3,200 linear feet (100,000 ft²) of shoring;
- Excavation of approximately 80,000 cubic yards (CY) of soil;
- Disposal of approximately 20,000 CY of the excavated soil containing LNAPL, importing 20,000 CY of replacement soil, and reuse of 60,000 CY of soil;
- Restoration of properties to current conditions.

Area 4: Parking area of 1 and 5 Foster Avenue (Seep Area) (same as Alternative 3)

- Remove soil containing LNAPL from the Seep Area to an approximate depth of five to seven feet.
- Restore the excavation area and reinstall the parking area.
- Install a collection trench south of Foster Avenue to prevent LNAPL transport under Foster Avenue from the parking area east of 2 and 4 Foster Avenue (source of LNAPL) to the Seep Area and Upper Hilliards Creek.

Area 5: Former Lagoon Area

- Remove approximately 20 feet of soil throughout the northwest portion of the Former Lagoon Area; and
- Backfill to grade and restore.

Area 6: Upper Hilliards Creek Floodplain Soils (same as Alternative 3)

- Remove all soil containing constituents greater than the ecological PRGs in the top one foot of the Upper Hilliards Creek flood plain.
- Remove all soil at depths greater than one foot where constituents are present at concentrations greater than the RDCSRS throughout the Upper Hilliards Creek floodplain.

Remedial Response Actions for Upper Hilliards Creek Contaminated Sediment

Alternative 1: No Action

Sediment Alternative 2 - Targeted Removal of Surface Sediment with Contaminants Greater than PRGs, Capping and Natural Recovery

Capital Cost	\$1,377,000
O&M Cost	\$16,500
Present Worth Cost	\$1,610,000
Time to Complete	2 months

One foot of sediment containing constituents at concentrations greater than the PRGs would be removed from Upper Hilliards Creek. A cap would then be installed, consisting of 6 inches

of sand, covered by 3 inches of stone, that would act as an armoring layer. Natural sedimentation would then be allowed to fill in above the armoring layer and reestablish the current elevation of the stream. As part of this alternative, the sediment that has accumulated in the Silver Lake conveyance system, located beneath the parking area between the 2 and 4 Foster Avenue buildings and the 7 Foster Avenue building, and the sediment that is in the concrete culvert south of Foster Avenue, would be removed.

Sediment Alternative 3 – Removal of All Sediment with Contaminants Greater than PRGs

Capital Cost	\$1,730,000
O&M Cost	0
Present Worth Cost	\$1,759,000
Time to Complete	3 months

This alternative would consist of excavation of all sediment in Upper Hilliards Creek containing contaminants at concentrations greater than the PRGs. The areas where sediment would be removed would be backfilled with clean material that would both remain stable and provide habitat for the benthic community. Because all contaminants present at concentrations greater than the PRGs would be removed, there would be no need for a cap.

Preferred Response Action

The Sherwin-Williams Site Team believes Soil Alternative 4, Deep and Intermediate Soil Removal, LNAPL Removal/Bioremediation, Soil Gas Removal, with Capping and Institutional Controls, and Sediment Alternative 3, Removal of All Sediment with Contaminants Greater than PRGs are the best alternatives for remediating the Site.

Under Soil Alternative 4, LNAPL would be addressed by a NAPL recovery system for deep recoverable LNAPL, excavation of LNAPL in shallow soils, and bioremediation of deep residual LNAPL. The LNAPL recovery system would be installed beneath the 2 Foster Avenue building located north of Foster Avenue where LNAPL is recoverable. LNAPL captured in the LNAPL recovery system would be shipped off-Site for treatment and disposal. Residual LNAPL located north of Foster Avenue and east of United States Avenue would be treated by in-situ bioremediation. Nutrients would be injected to stimulate and accelerate ongoing biodegradation of the LNAPL in these areas. The shallow LNAPL, located south of Foster Avenue, ranging in depth from the surface to approximately seven feet below ground surface, would be excavated and disposed off-Site.

Areas of arsenic contamination located beneath and to the south of the 6 West Clementon Road building slab, are considered sources to groundwater contamination and will be excavated to depths ranging from 10 to 15 feet below ground surface. PCB contamination in the area directly north of the 10 Foster Ave building would be excavated to a maximum depth of six feet below ground surface to remove PCBs exceeding 50 parts per million (50 ppm) in soil. Soil contaminants found on the 7 Foster Avenue commercial property, and the remaining soil contamination in the area north of Foster Avenue that is east of the 2 and 4 Foster buildings, excluding soil beneath the existing building footprints, would be excavated to a depth of four feet to meet IGWSSL or RDCSRS. Contaminants remaining above the water table, beneath the four-foot excavation footprint, that exceed the IGWSSL or their RDCSRS

would receive a cap. Institutional controls in the form of deed notices would be required for areas where contamination exceeds residential cleanup goals below excavation limits. The roadways are not being excavated to remove contaminants and would also require institutional controls in the form of deed a notice in areas that exceed the non-residential direct contact soil cleanup goals.

Under Soil Alternative 4, soil in the western portion of the Former Lagoon Area would be excavated to a depth of approximately 8 feet below ground surface to address the source of pentachlorophenol in groundwater. Sections of the Former Lagoon Area that exceed the IGWSSL or Site-specific impact to groundwater remedial goals for pentachlorophenol above the water table would be removed and disposed off-Site. Areas of pentachlorophenol below the water table that exceed the RDCSRS for pentachlorophenol would remain beneath the existing soil cap and would require institutional controls in the form of a deed notice.

Soil Alternative 4 involves removal of all soil containing constituents greater than the ecological PRGs in the top one foot of the Upper Hilliards Creek flood plain. Any soil at depths greater than one foot where constituents are present at concentrations greater than the RDCSRS throughout the Upper Hilliards Creek floodplain would also be removed.

Sediment Alternative 3 involves excavation of all sediment in Upper Hilliards Creek containing contaminants at concentrations greater than the PRGs. The areas of sediment excavation would be backfilled with clean material that would remain stable and provide habitat for the benthic community.

NRRB Review Decision

Based on the RRRT briefing and subsequent discussion, the Region 2 RRRT reached a conclusion that a full NRRB review is not warranted, as described in OSWER's September 4, 2014 Directive. Factors forming the basis of this decision included:

1. The preferred response action provides for a high level of removal of contaminated soils at the Site, through deep excavation of those areas that act as a potential source to shallow groundwater contamination. In addition, excavation of remaining soil contaminants to a depth of four feet in Area 1 of the FMP provides for long-term protectiveness. These properties in Area 1 are located at the headwaters of Upper Hilliards Creek and drain directly into that waterbody which will also be remediated. The four-foot excavation depth provides for greater long-term protectiveness in that it does not solely rely on institutional controls and existing surficial caps to protect against potential releases and exposures from incidental shallow utility installations, maintenance, repair or improvements common to active commercial and light industrial facilities. The four-foot excavation depth is consistent with the selected remedy for paved commercial areas in the Route 561 Dump Site Decision Document (2016). The "Dump Site" is another Sherwin-Williams Site located in Gibbsboro, New Jersey. This alternative would generally remove the highest concentrations of soil contamination in Subarea 1, while capping remaining areas soils with lower concentrations. Finally, LNAPL contamination is being addressed in Area 2 in a manner that would retain the 2 and 4 Foster Avenue buildings (through bioremediation and LNAPL recovery activities), while excavation of LNAPL would occur in Area 4 and the Seep Area

(where it is shallowest), and the deep LNAPL in Area 3 (residential properties) would undergo bioremediation.

2. The preferred response action would comply with all federal and state ARARs.
3. Although the Mayor of Gibbsboro is opposed to deed notices, the community and local government leaders have constructively responded to past EPA actions and support for Region 2's preferred response action is anticipated.
4. There is support from NJDEP for the preferred response action.
5. The preferred response action fulfills the Reduction of Toxicity, Mobility, or Volume NCP criterion to a greater degree than all alternatives, except for Alternative 5.
6. The preferred response action is the best combination of alternatives based on overall protection and cost.
7. All actions in the preferred response action are readily implementable, and the technologies are standard through industry and the EPA Superfund program.
8. The preferred response action is consistent with national policy and guidance.

We are preparing a draft Proposed Plan that we will share with Sun Yi and Christine Poore in the coming weeks. Issuing a Record of Decision for the SW/HC Site is a Regional commitment for this Fiscal Year. My staff and I are available to discuss the SW/HC Site, so please call me at (212) 637-4435 if you require additional information.

cc: Sun Yi, OSTRI/ARD/SARDB
Christine Poore, OSTRI/ARD/SARDB
Douglas Ammon, OSTRI/ARD/SARDB



Figure 1:
Historic Site Layout



Figure 2:
Site Layout



Map data © OpenStreetMap contributors, Imagery © Mapbox, Imagery © Mapbox
 Printed: 02/28/2018 10:00 AM
 Scale: 1" = 100'



DATE: February 2018	BY: D. Kane
FOR: The Sherwin-Williams Company	BY: A. Fisher
PROJECT: Remedial Investigation	BY: A. Fisher

FOR: The Sherwin-Williams Company
PROJECT: Remedial Investigation

Figure 3:
Site Sub Areas

Table 1 - Preliminary Remediation Goals for Soil and Sediments* Contaminants

Contaminants	NJ Residential Direct Contact Soil Remediation Standard (mg/kg)	NJ Non-Residential Direct Contact Soil Remediation Standard** (mg/Kg)	Default NJ Impact to GW Screening Levels (mg/kg) (Above the Water Table)	Ecologically Derived Cleanup Value for Upper Hilliards Creek Floodplain Soils (top 1 foot mg/kg) and Sediments	Site Specific Soil Value for Saturated Soils
Metal Contaminants					
Arsenic	19	19	19	19	50
Cyanide	47	680	20	58	—
Lead	400***	800	90	213	—
Semi-Volatile Organic Compound Contaminants					
Naphthalene	6	17	25	—	—
Pentachlorophenol	0.9	3	0.3	—	15
Volatile Organic Compound Contaminants					
Benzene	2	5	0.005	—	—
Polycyclic Aromatic Hydrocarbons (PAHs) Contaminants					
Benzo(a)anthracene	5	17	0.8	—	—
Benzo(b)fluoranthene	5	17	2	—	—
Benzo(a)pyrene	0.5	2	0.2	—	—
Dibenzo(a, h)anthracene	0.5	2	0.8	—	—
Indeno (1,2,3 - CD) pyrene	5	17	7	—	—
Polychlorinated Biphenyls (PCBs) Contaminants					
Aroclor 1254	0.2	1	0.2	—	—
Aroclor 1260	0.2	1	0.2	—	—

* The ecologically derived sediment cleanup values are also being utilized for the top 1 foot of floodplain soils.

**The NJDEP Non-Residential Direct Contact Soil Remediation Standard (NRDCSRS) are applicable to soil contaminants which may exist under Foster and United States Avenue.

*** Additionally, to achieve the risk reduction goal established for the Site, which is to limit the probability of a child's blood lead level exceeding 5 µg/dL to 5% or less, the average lead concentration across the surface of the remediated area must be at or below 200 mg/kg.

Table 2 – Preliminary Remediation Goals for LNAPL Contamination

Contaminant	NJ Interim Groundwater Quality Standards for Tentatively Identified Compounds (TICs) µg/L	Methane Concentrations
Total TIC Compounds	500 µg/L	--
Individual TIC Compound	100 µg/L	--
Total Carcinogenic TIC Compounds	25 µg/L	--
Individual Carcinogenic TIC Compound	1 µg/L	--
Indoor air methane concentrations must be addressed:	--	Not to exceed the Lower Explosive Limit (LEL)